Insulin Glargine - another gift for people with diabetes

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Insulin has been called the "Gift of Life" for people with Diabetes especially Type 1 Diabetes. Its discovery by Frederick Banting and Charles Best in 1921 brought a revolution in the history of medicine. Initially it was a crude pancreatic extract which gave back life and health to many children. Research continued to find better and improved insulins and the quest moved ahead. Animal insulins were improved to become less antigenic and were eventually replaced by synthetic insulins with a human formula. The search for new insulins led to the discovery of Insulin Analogues, which were less antigenic and provided better results in maintaining normoglycaemia.

Insulin is used for both Type 1 and Type 2 Diabetes. As Type 1 Diabetes is caused by an absolute lack of insulin production, insulin is a life saver for such an individual and the therapy starts right from diagnosis.

Diabetes Type 2 has a progressive course due to a gradual loss of the functional Beta cells of the pancreas. The deficiency is marked in the early phase by a rising fasting blood glucose level due to unregulated nocturnal hepatic glucose output. This group of people are advised Nutritional therapy along with physical fitness exercises initially. An oral hypoglycaemic agent is added where necessary. The eventual goal of the therapy for either of the diabetes subjects, is to keep the HbA1c levels at < 7.0%. This has proved to be protective against development of the chronic complications of diabetes. The aim of all treatment is to provide a basal insulin level along with prandial insulin similar to what nature does.The former component mimics the small and constant release of insulin that regulates lipolysis and hepatic glucose output, whereas the latter mimics the response of endogenous insulin to food intake.

Insulin is required by both groups of people with diabetes at some stage. Type 1 has an immediate requirement whereas Type 2 subjects may need insulin replacement some years after diagnosis. The available insulins are presently the human insulin in the form of short acting Regular or intermediate acting NPH.With improvement in technology, came Insulin Analogues or Designer Insulins into production, Two main categories were developed,the Rapid Acting Analogues to fulfil the Bolus requirements and the Long Acting Analogues for "Basal" needs. The LAA provide a definite advantage by providing a peakless basal insulin level with a long half life, It is given as a once daily dose and has very scarce chances of nocturnal hypoglycaemia.

Insulin Glargine, a LAA, was introduced in 2001. It is produced by substitution of the aminoacid glycine for asparagine at position A21 and addition of two arginine molecules at position B30. The pH is set at 4.0 making it acidic and it precipitates after injection to form a depot which helps in its slow release. The onset of action is within 2-4 hours with the duration of action being 24-30 hours. This helps in providing a better glycaemic control, lesser weight gain, remote chances of nocturnal hypoglycaemia and a constant basal insulin level. Glargine is given subcutaneously as a single daily dose which brings the fasting blood glucose between 75 and 110 mg/dl. It achieves this target by reducing hepatic glucose output. The daytime blood glucose is stabilized by Oral Hypoglycaemic Agents.

Glargine can be used in all people with diabetes including children above six years age. It is still not recommended during pregnancy.

Many trials have been conducted to assess the efficacy of Insulin Glargine. The famous Treat-to-Target trial[1] gave encouraging results with the A1C levels being reduced to less than 7% in patients using Injection Glargine or NPH combined with oral hypoglycaemic agents. Nocturnal Hypoglycaemia

episodes were less with glargine compared to NPH, which have been reported by other researchers also.[2,3]

Experience has shown that starting a single dose insulin regime, especially a basal insulin as an analogue, will achieve adequate HbA1c in 45% cases. In the remaining, the treatment will have to be upgraded to a two dose regime. This will provide an improved control in about 75% patients. Further intensification to three -dose regime will improve the HbA1c level to the recommended < 7% in a total of 87-90% patients.[4] If the same insulin regime is used to initiate, titrate, intensify and control diabetes, besides being beneficial it is easier for not only the patient and family members but also for the doctors, nurses and educators.

In Type 1 diabetes, Glargine can be used as a basal - bolus regimen, it is recommended in children above six years age and it provides a satisfactory control when combined with a short acting analogue before each meal. In a growing child, the requirements alter from day to day. The basal bolus regime provides laxity and freedom for changing the dose according to the needs.

Insulin Glargine has proved to be a very beneficial addition to the insulin armamentarium for people with diabetes, both Type 1 and Type 2. The health care team has the responsibility of providing the appropriate preparation in the correct dose to the patient along with the necessary instructions of its use. Glargine is definitely an improvement on the existing NPH insulin with regards to glycaemic control and episodes of nocturnal hypoglycaemia.

References

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